COMMONWEALTH OF AUSTRALIA

Copyright Regulations 1969

Warning

CHARLES DARWIN UNIVERSITY

Family Name	
Given Names	
Student Number	
Teaching Period	Semester 2, 2016

FINAL EXAMINATION	**DURATION**
ENG417 – Sustainability	Reading Time: **10** minutes Writing Time: **180** minutes

INSTRUCTIONS TO CANDIDATES

The examination has one (1) section with five (5) questions: answer any four (4) questions.

Please write your answers on the booklet provided.

Please ensure that your name and student number are clearly indicated on your answers and at the top of this examination paper.

Note that all questions ARE of equal value (25 marks each).

Read ALL questions carefully.

This examination accounts for a total of 45 % of the marks available for this unit.

EXAM CONDITIONS

You may begin writing from the commencement of the examination session. The reading time indicated above is provided as a guide only.

This is a RESTRICTED OPEN BOOK examination

Any non-programmable calculator is permitted

No handwritten notes are permitted

Hard copy, unannotated English translation dictionary only

ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED
None	1 x 20 Page Book

THIS EXAMINATION IS PRINTED DOUBLE-SIDED.

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.

Question 1. (25 marks)
Compare and contrast the traditional ("hard"), and green/eco- ("soft"), engineering approaches to tropical highway infrastructure management in low-lying coastal areas (*e.g*. the NT's "Top-end") needed to prevent likely harm caused by sea level rise.

Explain how a balanced, sustainable engineering solution can be achieved to satisfy the triple-bottom-line approach to sustainability with reference to real-life case studies.

Question 2. (25 marks)
A sustainable economic and fiscal (taxation) framework is a key part of the engineering procurement process.

Propose, and justify, key sustainability criteria for inclusion in any fiscal (taxation) framework relating to the procurement of engineering products or information technology services.

Question 3. (25 marks)
Discuss whether or not Engineers Australia, or the Australian Computer Society, should be concerned about the Australian Federal Government's reaction to increasingly aggressive Chinese activity in the South China Sea and its likely future impact upon *one* of: civil, chemical, electrical, mechanical, or structural engineering, or information technology.

Question 4. (25 marks)
Discuss how an engineer could apply sustainable engineering practice, as enshrined in the green principle of the four Rs (Reduce, Re-use, Recycle, and Recover), to ***one*** of the engineering projects shown in Fig. Q. 4.

Fig. Q. 4a Window cleaning, high-rise buildings, June 2016, Brisbane, Qld

Fig. Q. 4b Park and landscape maintenance, September 2016: River Esk, Tasmania

Fig. Q. 4c Qantas fleet operations: Darwin International Airport, NT

Fig. Q. 4 Engineering projects for 4R review

Question 5. (25 marks)
Part (a) (15 marks)

Explain the circumstances giving rise to the likely 2016 La Niña and assess their likely implications for town planning and housing construction in Darwin.

Part (b) (10 marks)

Explain the potential implications of the cloud cover trend shown in Fig. Q. 5b on the Northern Territory's future solar energy generation strategy.

Note: 1 okta represents cloud coverage of a ⅛-part of the visible sky dome.

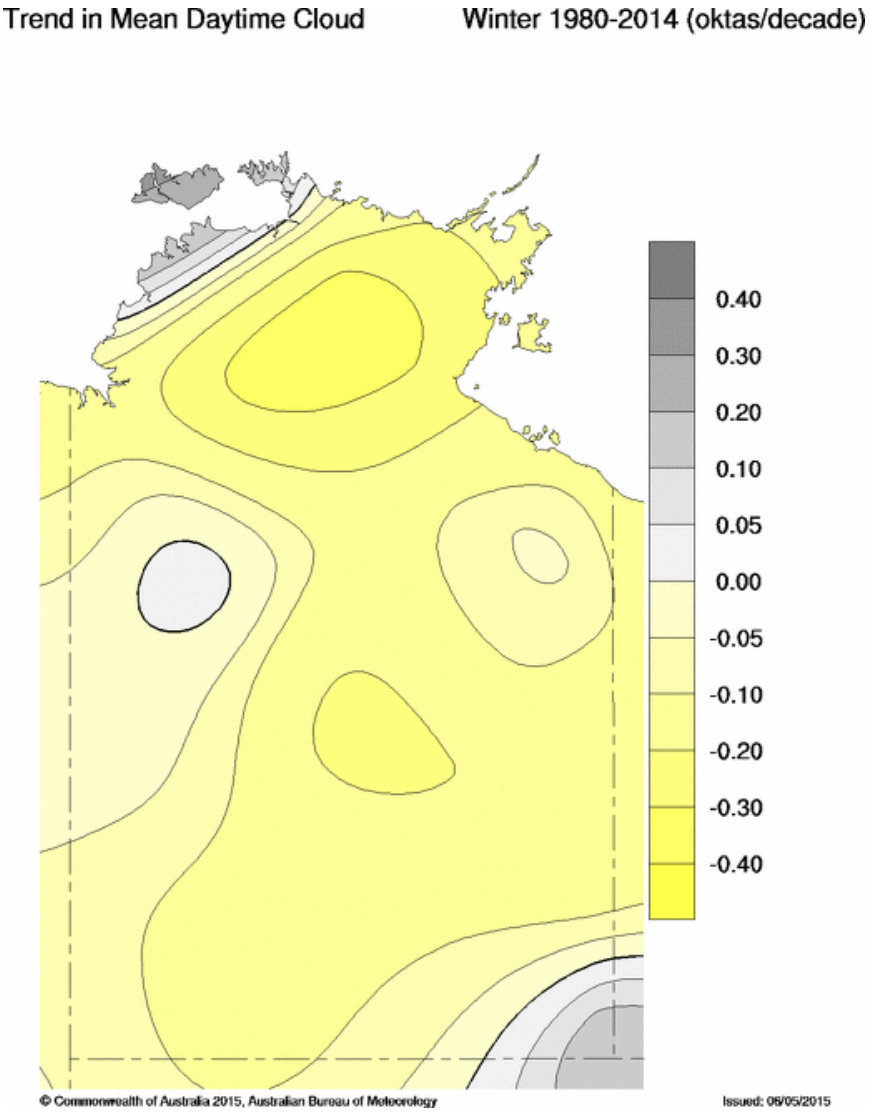

Fig. Q. 5b Winter (1 June to 31 August) cloud cover trend: NT, Australia (1980 to 2014)[1]

[1]Commonwealth of Australia (2016) Australian climate variability & change - Time series graphs. http://www.bom.gov.au/climate/change/#tabs=Tracker&tracker=trend-maps, Bureau of Meteorology, last accessed: 12 Sep., 2016.